

Jose Roberto Ayala Solares

Machine Learning Scientist

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TECHNICAL SKILLS

Statistical Learning Regression, Confidence intervals, Bayesian and Monte Carlo methods

Machine Learning Classification, Regression, Survival analysis, Feature engineering, Bayesian optimization

Deep Learning CNN, RNN, LSTM, Keras, TensorFlow, PyTorch

R tidyverse, caret, recipes, rsample, brms

Python NumPy, SciPy, pandas, scikit-learn

Visualisation ggplot2, matplotlib, seaborn

WORK EXPERIENCE

Machine Learning Scientist

University of Oxford - The George Institute for Global Health

10/2017 – Present

Oxford, United Kingdom

- Analyzing some of the largest and most complex biomedical datasets that have ever been collected to generate insights into complex disease patterns, risk trajectories and treatment effects.
- Developing a comparative study of different deep learning architectures that aim to identify hierarchical regularities and dependencies in electronic health records from the Clinical Practice Research Datalink (CPRD) in order to get an efficient patient representation.
- Researching how to apply natural language processing techniques for the discovery, prognostication and understanding of disease clusters and trajectories.

Ph.D. Researcher

The University of Sheffield

10/2013 – 09/2017

Sheffield, United Kingdom

- Implemented machine learning algorithms for modelling and analysis of environmental systems using NARX models.
- Developed a package in the R programming language for construction, validation and testing of NARX models.
- Analyzed space weather data for the prediction of terrestrial magnetosphere activity.
- Analyzed oceanographic data for the analysis and forecasting of the Atlantic Meridional Overturning Circulation.

EDUCATION

Ph.D. in Automatic Control and Systems Engineering

The University of Sheffield

10/2013 – 09/2017

Sheffield, United Kingdom

- Thesis Title: Machine Learning and Data Mining for Environmental Systems Modelling and Analysis

M.S. in Applied Mathematics and Computational Science

King Abdullah University of Science and Technology

08/2009 – 12/2011

Thuwal, Saudi Arabia

- Thesis Title: Optimal Power Allocation of a Wireless Sensor Node under Different Rate Constraints

B.S. in Mechatronics Engineering

Instituto Tecnológico y de Estudios Superiores de Monterrey

08/2004 – 12/2008

Mexico City, Mexico

- Thesis Title: Robotic Vehicle Control by Artificial Intelligence

TEACHING EXPERIENCE

Mathematics and Data Modelling

The University of Sheffield

01/2014 – 05/2017

Sheffield, United Kingdom

- Intermediate level course that aimed to develop student skills in the theory and application of core mathematics tools required for systems engineering and the application of these in system simulation and data-based modelling.

Numerical Methods for Engineers

Instituto Tecnológico y de Estudios Superiores de Monterrey

05/2012 – 06/2013

Mexico City, Mexico

- Intermediate level course that used analysis and mathematical thinking to solve complex engineering problems through the use of numerical methods and computational tools. The course implemented the use of the Acadox educational platform for the first time in Latin America.

Python Programming for Robotics

Instituto Tecnológico y de Estudios Superiores de Monterrey

05/2012 – 06/2013

Mexico City, Mexico

- Introductory level course that used analysis and mathematical thinking to solve complex problems in robotics through the use of the Python programming language.

LANGUAGES

Spanish
Native Language

English
Fluent

Esperanto
Upper-intermediate

French
Beginner

PUBLICATIONS

Journal Article

Deep Learning for Electronic Health Records: A Comparative Review of Multiple Deep Neural Architectures

Author(s)

J. R. Ayala Solares, F. Raimondi, Y. Zhu, F. Rahimian, D. Canoy, J. Tran, A. C. Pinho Gomes, A. Payberah, M. Zottoli, M. Nazarzadeh, K. Rahimi and G. Salimi-Khorshidi

In Preparation

Journal Article

Predicting the risk of emergency hospital admissions in the general population: development and validation of machine learning models in a cohort study using large-scale linked electronic health records

Author(s)

F. Rahimian, G. Salimi-Khorshidi, J. Tran, A. Payberah, J. R. Ayala Solares, F. Raimondi, M. Nazarzadeh, D. Canoy, and K. Rahimi

Accepted for Publication

PLOS Medicine

Journal Article

The variability of the Atlantic meridional circulation since 1980, as hindcast by a data-driven nonlinear systems model [↗](#)

Author(s)

J. R. Ayala Solares, H.-L. Wei, G. R. Bigg

2018

Acta Geophysica, DOI: 10.1007/s11600-018-0165-7

URL: <https://link.springer.com/article/10.1007/s11600-018-0165-7>

Ph.D. Thesis

Data Mining and Machine Learning for Environmental Systems Modelling and Analysis [↗](#)

Author(s)

J. R. Ayala Solares

2017

University of Sheffield

URL: <http://etheses.whiterose.ac.uk/18321/>

PUBLICATIONS

Journal Article

A novel logistic-NARX model as a classifier for dynamic binary classification [↗](#)

Author(s)

J. R. Ayala Solares, H.-L. Wei, S. A. Billings

2017

Neural Computing and Applications, DOI: 10.1007/s00521-017-2976-x

URL: <https://link.springer.com/article/10.1007/s00521-017-2976-x>

Journal Article

Modelling and prediction of global magnetic disturbances in near-Earth space: A case study for Kp index using NARX models [↗](#)

Author(s)

J. R. Ayala Solares, H.-L. Wei, R. J. Boynton, S. N. Walker, S. A. Billings

2016

Space Weather, DOI: 10.1002/2016SW001463

URL: <http://onlinelibrary.wiley.com/doi/10.1002/2016SW001463/>

Journal Article

Power Minimization of a Wireless Sensor Node Under Different Rate Constraints [↗](#)

Author(s)

J. R. Ayala Solares, L. Sboui, Z. Rezki, M.-S. Alouini

2016

IEEE Transactions on Signal Processing, Vol. 64, No. 13, DOI: 10.1109/TSP.2016.2548991

URL: <http://ieeexplore.ieee.org/document/7445223/>

Journal Article

Nonlinear model structure detection and parameter estimation using a novel bagging method based on distance correlation metric [↗](#)

Author(s)

J. R. Ayala Solares, H.-L. Wei

2015

Nonlinear Dynamics, DOI: 10.1007/s11071-015-2149-3

URL: <https://link.springer.com/article/10.1007/s11071-015-2149-3>

Book Chapter

The Power of Natural Inspiration in Control Systems [↗](#)

Author(s)

H. E. Ponce Espinosa, J. R. Ayala Solares

2015

Nature-Inspired Computing for Control Systems. Studies in Systems, Decision and Control. Springer, DOI: 10.1007/978-3-319-26230-7_1

URL: https://link.springer.com/chapter/10.1007/978-3-319-26230-7_1

Conference Proceedings

A New Distance Correlation Metric and Bagging Method for NARX Model Estimation [↗](#)

Author(s)

J. R. Ayala Solares, H.-L. Wei

2014

The University of Sheffield Engineering Symposium Conference Proceedings, Vol. 1, DOI: 10.15445/01012014.31

URL: <http://eprints.whiterose.ac.uk/85053/>

Conference Paper

Optimal power allocation of a single transmitter-multiple receivers channel in a cognitive sensor network [↗](#)

Author(s)

J. R. Ayala Solares, Z. Rezki, M.-S. Alouini

2012

IEEE International Conference on Wireless Communications in Unusual and Confined Areas (ICWCUCA), 2012, DOI: 10.1109/ICWCUCA.2012.6402479

URL: <http://ieeexplore.ieee.org/document/6402479/?reload=true>

Conference Paper

Optimal power allocation of a sensor node under different rate constraints [↗](#)

Author(s)

J. R. Ayala Solares, Z. Rezki, M.-S. Alouini

2012

IEEE International Conference on Communications (ICC), 2012, DOI: 10.1109/ICC.2012.6363758

URL: <http://ieeexplore.ieee.org/document/6363758/>